

# EASYLOGIX.DE



## PCB-Investigator Physics

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# PCBi - Physics

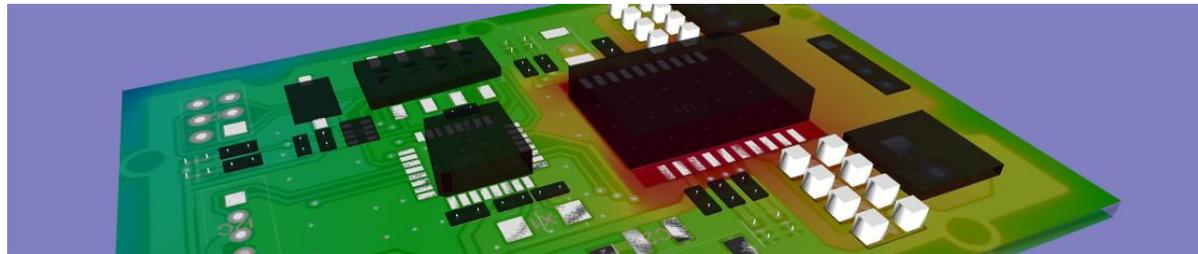
## Why do I need PCBi - Physics?

PCB-Investigator Physics is the perfect tool to simulate the **physical behaviour** of your Printed Circuit Boards during development phase.

It enables you to find **thermal hotspots**, critical trace **resistances** and **voltage drops** that are too high, even before prototyping begins!

With the built-in editing functions of PCB-Investigator Physics it's even possible to **optimize the layout** and stack-up to achieve the best possible physical behaviour with only a few clicks!

Save valuable time and prototype costs with the simulations of PCBi-Physics!



Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

We piqued your interest?



# PCBi - Physics

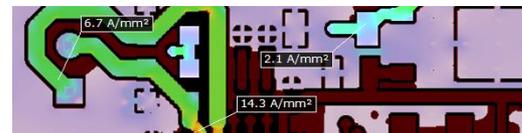
## Why do I need PCBi - Physics?

To get information about the physical behaviour of your Printed Circuit Board during operation, PCB-Investigator Physics enables you to simulate the following physical properties:

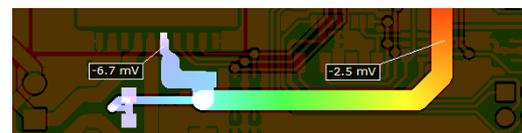
- The **Temperature** raise at each location of the PCB caused by power loss of components or by high currents



- The **Current Density**, e.g. at copper bottlenecks or in drills



- The **Voltage Drop** and **Copper Resistance** between any pins on any layer



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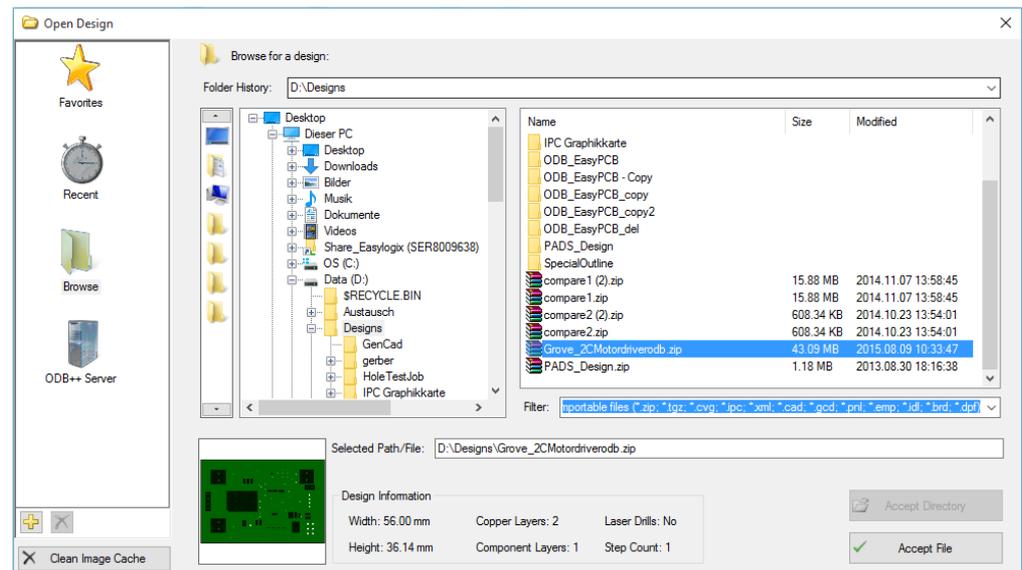
# PCBi - Physics

## Which data is needed?

As input data you can select any CAD format supported by PCB-Investigator.

### Supported formats are:

- ODB++
- GenCAD
- IPC2581
- IDF 2.0 / 3.0
- Gerber274x
- ...



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# PCBi - Physics

## How to run the Simulation?

### 1) Enter general Project parameters

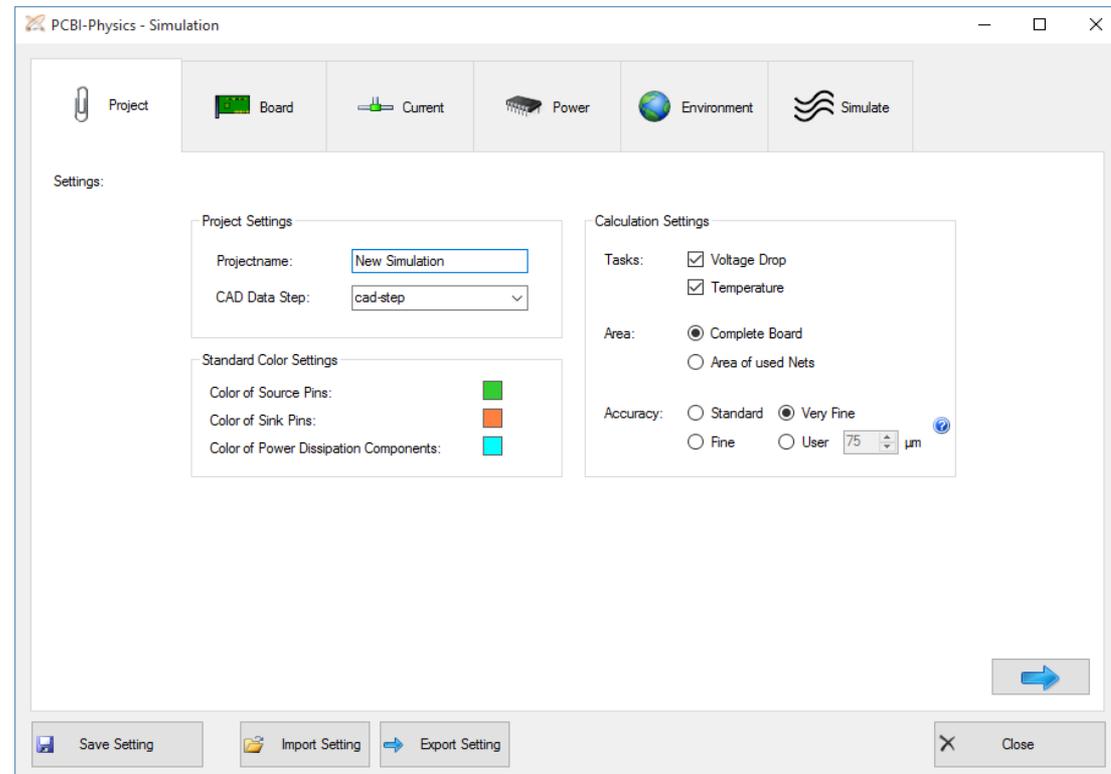
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# PCBi - Physics

## How to run the Simulation?

2) Enter Stack-Up information (Copper foils, Prepregs)

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The screenshot shows the PCBi-Physics - Simulation software interface. The Board Info panel on the left lists the stack-up layers: 1 TOP, PREPREG\_1, 2 BOTTOM, and DRILL. The main window displays the Stack-Up configuration table for the file c:\users\easylogix\appdata\local\temp\grove\_2cmotordriverodb. The table includes columns for Layername, Context, Type, and Layer Height. A red circle highlights the '1 TOP' layer configuration.

Layername	Context	Type	Layer Height
COMP+_TOP		Component	
SOLDERPASTE_TOP		Solderpaste	0.00 µm
SOLDERMASK_TOP	other	Soldermask	0.00 µm
1 TOP	Copper;35	Signal	35.00 + 25.00 µm
PREPREG_1	other	Dielectric	1308.00 µm
2 BOTTOM	Copper;35	Signal	35.00 + 25.00 µm
SOLDERMASK_BOTTOM	other	Soldermask	0.00 µm
SOLDERPASTE_BOTTOM		Solderpaste	0.00 µm
DRILL		Drill	



# PCBi - Physics

## How to run the Simulation?

3) Enter Current Sources / Sinks for each important net

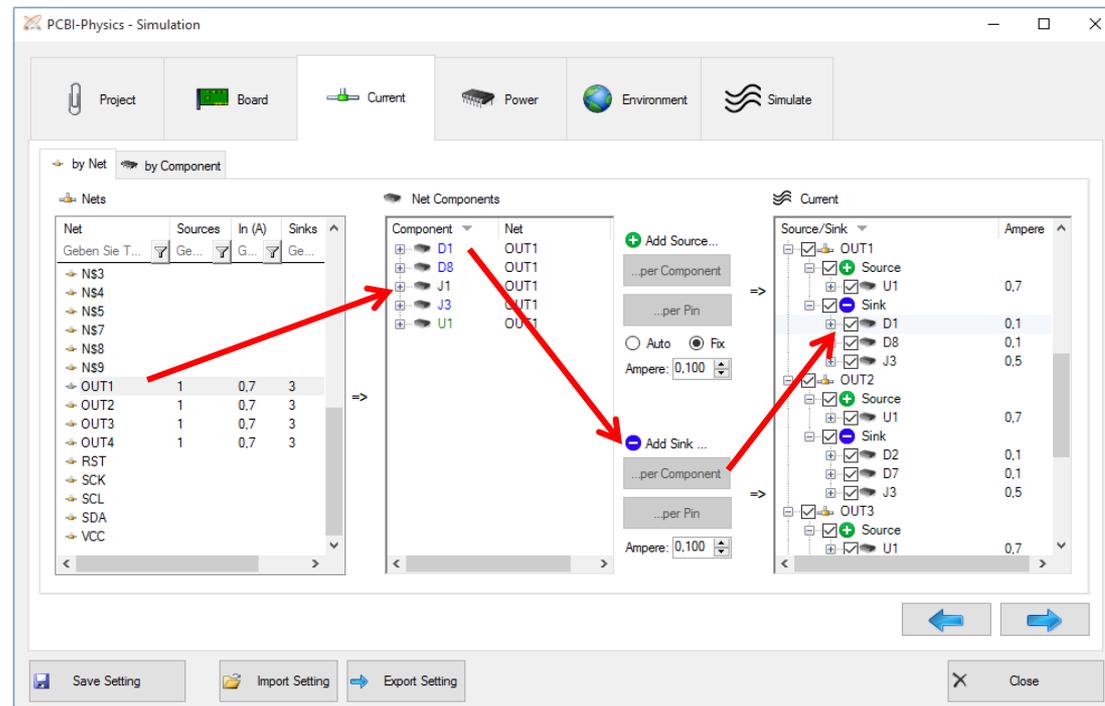
Why do I need PCBi-Physics?

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# PCBi - Physics

## How to run the Simulation?

### 4) Enter Power Dissipation for each Component

Why do I need PCBi-Physics?

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The screenshot shows the 'PCBi-Physics - Simulation' window with the 'Power' tab selected. The 'Power Dissipation' section is active, displaying two tables: 'All Components' and 'Components with Power Dissipation'. A red arrow points from the 'D1' row in the 'All Components' table to the 'Power Loss' input field, which is set to '0.100 Watt'. Another red arrow points from the '+' button to the 'D1' row in the 'Components with Power Dissipation' table, where the 'Power Loss (W)' is '0.100' and 'Height (mm)' is '1.5'. The 'Components with Power Dissipation' table also shows other components like D2-D9, I2C, IC1, and U1 with their respective power loss and height values.

Component	Power Loss (W)	Height (mm)
D1	0.100	1.5
D2	0.1	1.5
D3	0.1	1.5
D4	0.1	1.5
D5	0.1	1.5
D6	0.1	1.5
D7	0.1	1.5
D8	0.1	1.5
D9	0.5	2.7
I2C		
IC1		
U1	4	3



# PCBi - Physics

## How to run the Simulation?

5) Enter environmental Temperatures and Heat Exchange values

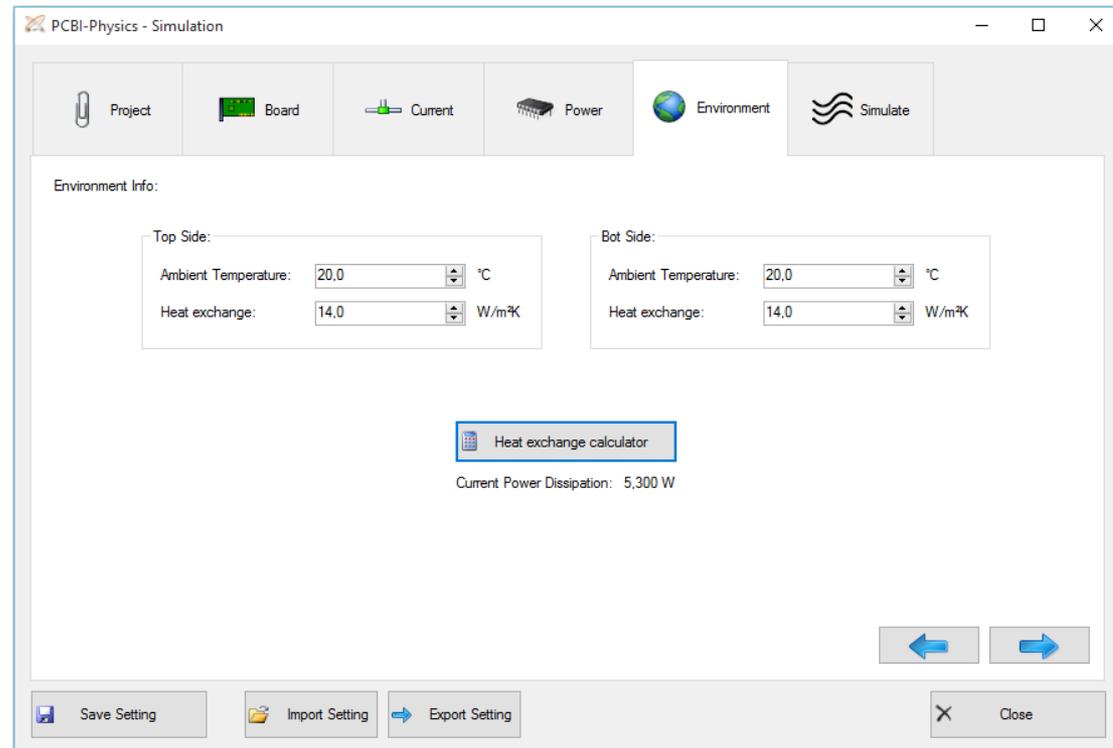
Why do I need PCBi-Physics?

Which data is needed?

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What does the result look like?

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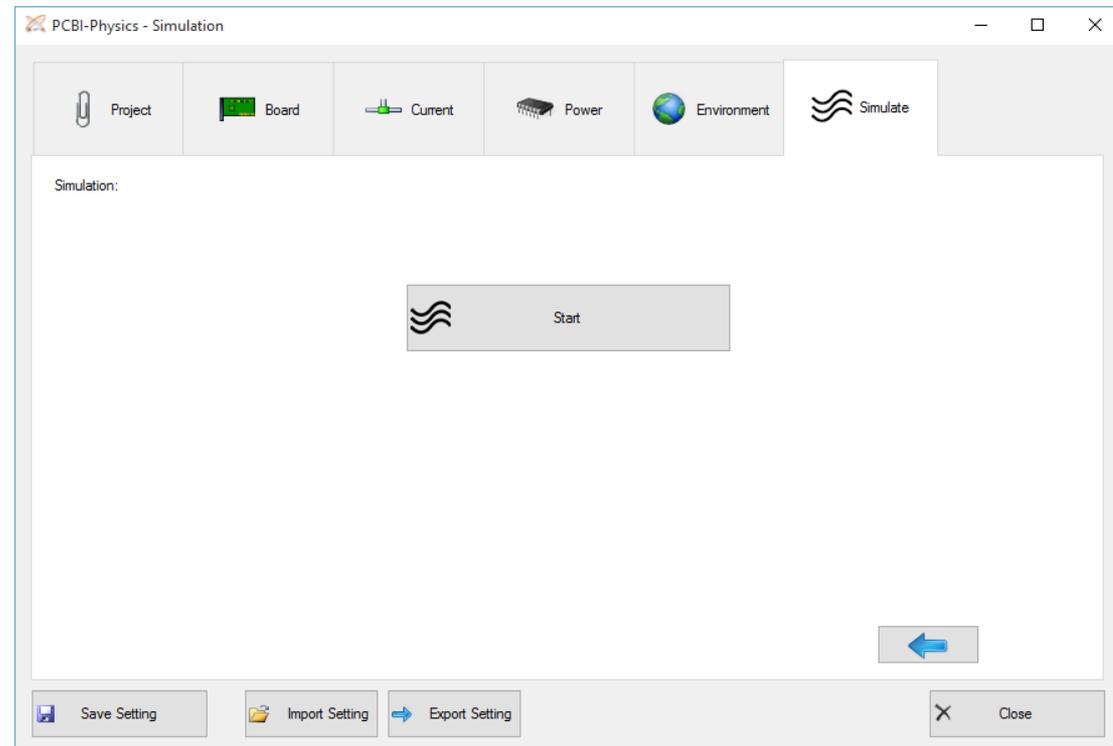




# PCBi - Physics

## How to run the Simulation?

6) Click "Start" to initiate the simulation process



Why do I need PCBi-Physics?

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# PCBi - Physics

## What does the result look like?

The simulation result can be evaluated in the "Result Viewer" by a graphical overlay on the CAD data or with the help of a report.

For documentation issues it is possible to add Notes showing the simulated values at important locations.

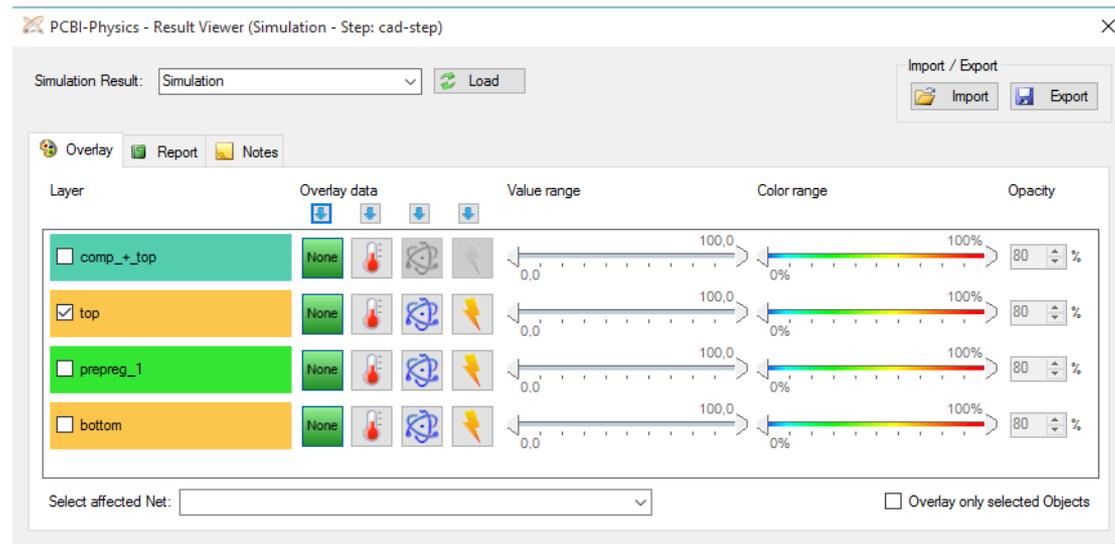
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The following slides will give a few examples...



# PCBi - Physics

## What does the result look like?

Example 1: Temperature Overlay with Notes

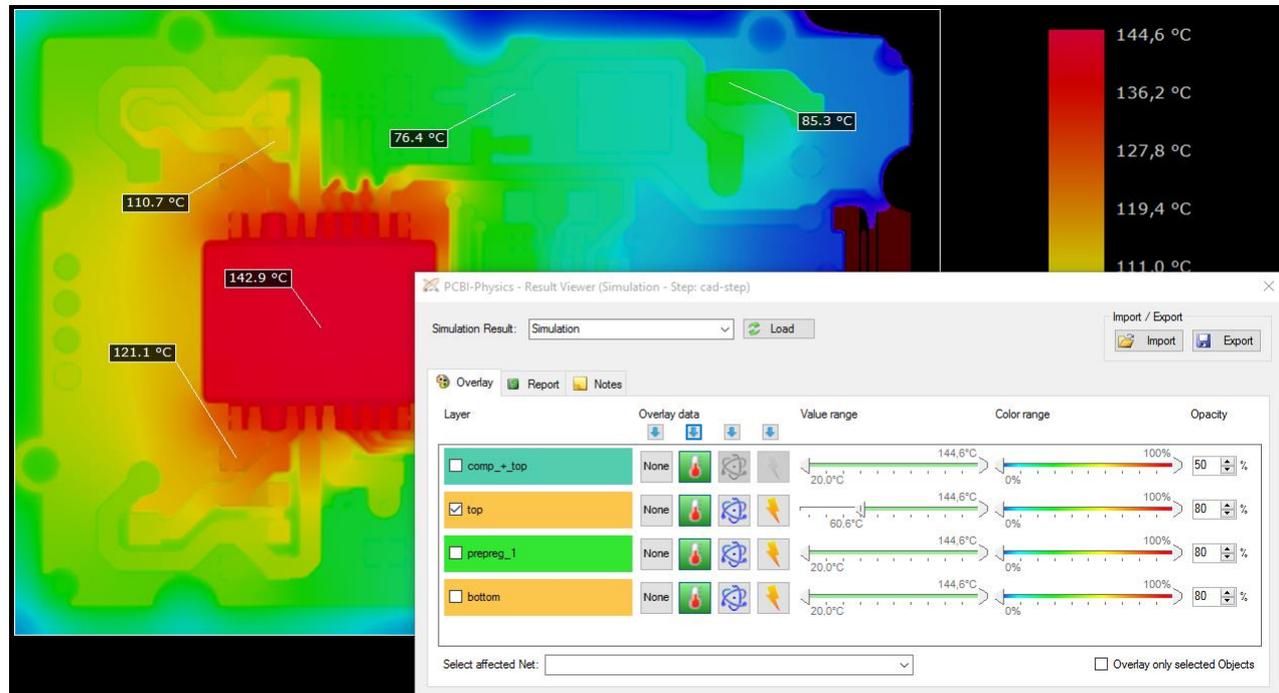
Why do I need PCBi-Physics?

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Temperature on the top signal layer (Filter: Temperature > 60°C)



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## What does the result look like?

Example 2: Current Density in the net "OUT1"



Current Density in the net "OUT1" over all layers

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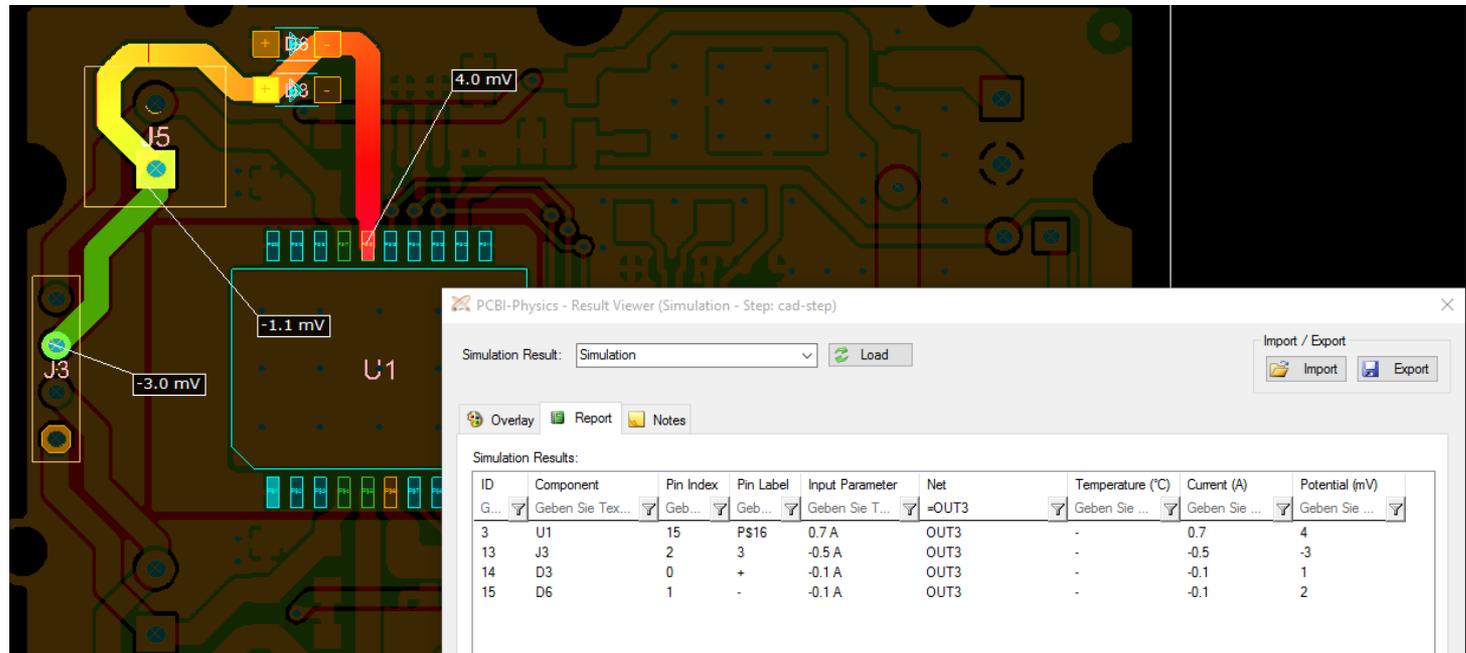
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# PCBi - Physics

## What does the result look like?

Example 3: Voltage Drop in the net "OUT3"



Voltage Drop in the net "OUT3" (Graphically and as Report)  
With this information the Resistance between e.g. U1 and J3 can be calculated ( $R = U/I$ )

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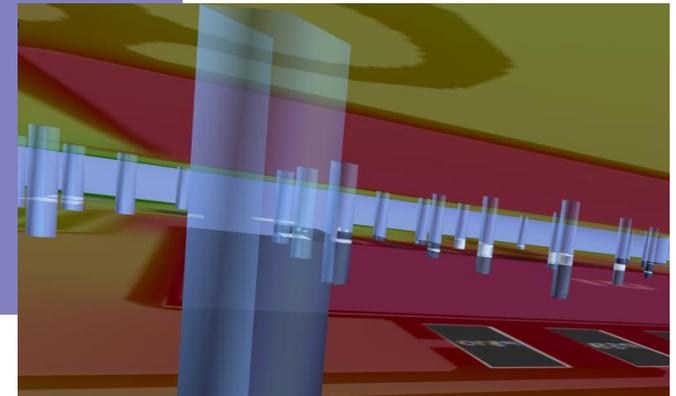
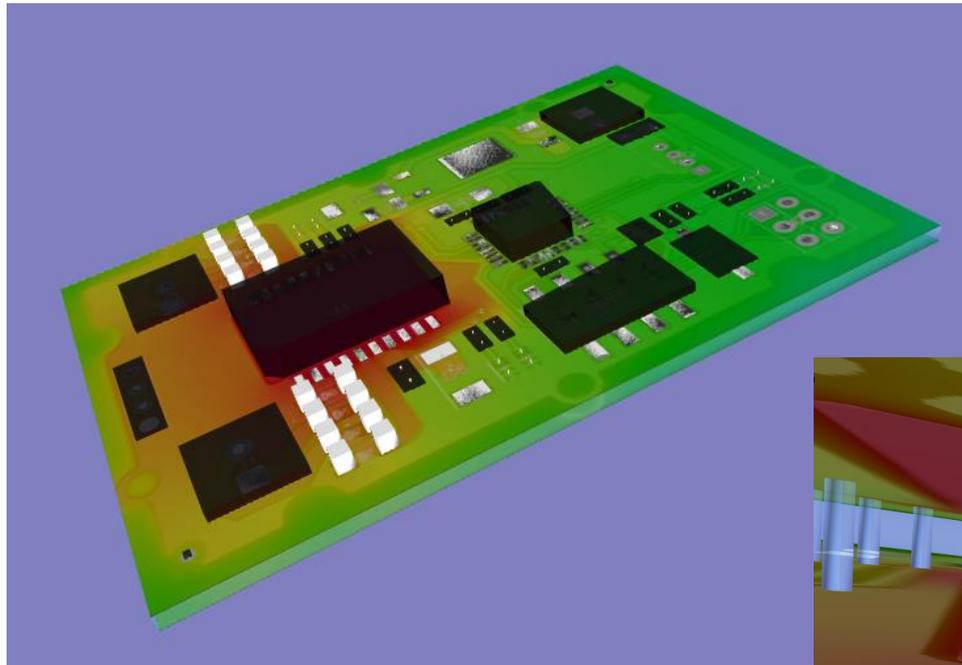
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# PCBi - Physics

## What does the result look like?

Example 4: 3D Views with Temperature Overlay



3D Views with Temperature Overlay

Why do I need  
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# PCBi - Physics

## What does the result look like?

### Example 5: PDF Documentation

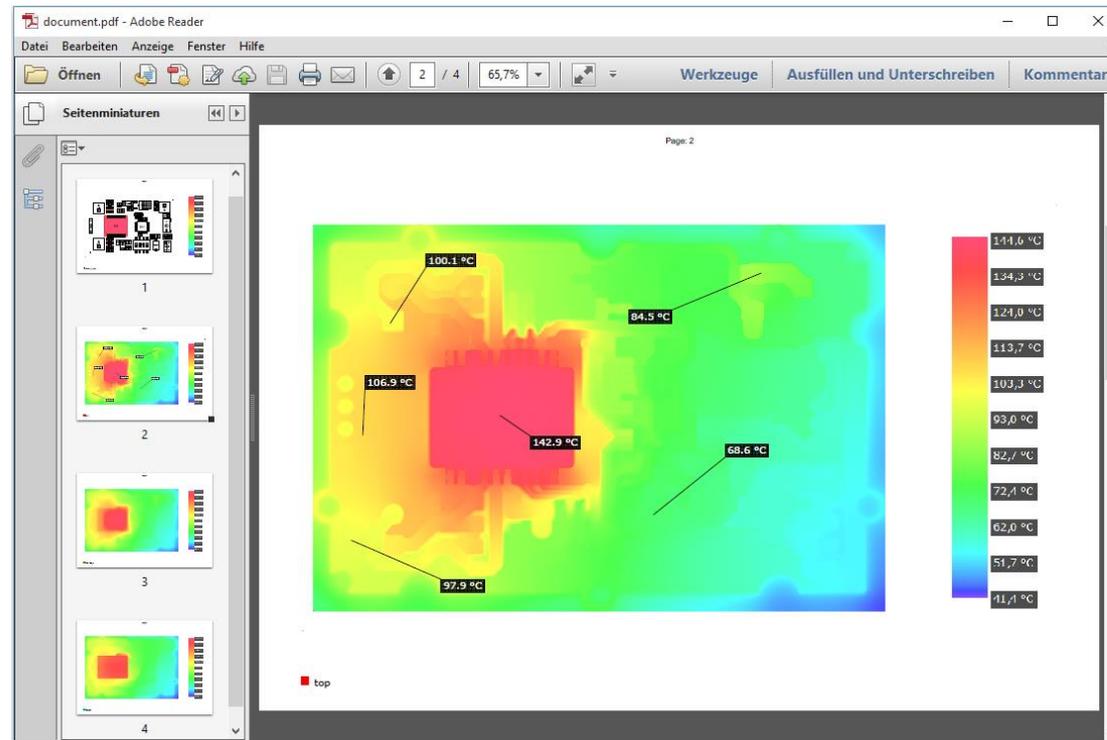
Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

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PDF Document with Temperature for each layer



# PCBi - Physics

**We piqued your interest?**

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Get in touch!

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or find more information here:

[www.PCBi-Physics.com](http://www.PCBi-Physics.com)



## Useful Links:

PCBi-Physics

[www.PCBi-Physics.com](http://www.PCBi-Physics.com)

PCB-Investigator

[www.pcb-investigator.com](http://www.pcb-investigator.com)

Native Board Import (3D Interface to CATIA, SiemensNX, SolidWorks, SolidEdge)

[www.sts-development.biz](http://www.sts-development.biz)

GerberLogix

[www.gerberLogix.com](http://www.gerberLogix.com)

Online Gerber Viewer

[www.Gerber-Viewer.com](http://www.Gerber-Viewer.com)

Software Development, CAD Converter, data connection

[www.easyLogix.de](http://www.easyLogix.de)